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ANTHROPOMETRIC STATISTICS OF CHILDREN—AGES SIX TO FORTY-EIGHT MONTHS.

About five years ago, the *Woman's Home Companion* inaugurated a novel plan to direct public attention to the fact that our children are less perfect, physically, than is generally assumed to be the case. In its inception this movement in favor of greater emphasis on *healthy* children and less emphasis on *good-looking* children was in the form of Better Babies Contests, which were held in various localities throughout the United States, usually under the auspices of some local organization, but with the coöperation of the Better Babies Bureau of the *Woman's Home Companion.*

In these Better Babies Contests the children were examined under three groups of questions: First, with reference to mental development; second, with reference to physical defects or impairments; and, third, with reference to physical development.

The different items in these main groups were given ratings. The total or maximum rating under the mental and developmental test was 200; under physical examination for defects or impairments, the total maximum rating was 700; and under physical measurements the total maximum rating was 100—making a grand total of 1000 points.*

Early in 1914 plans were made for the holding of a Better Babies Contest in Newark, N. J., in March of that year. This contest was under the joint auspices of *Contemporary,* a prominent local organization of women, and the State Pediatric Society. The instructions, score cards, literature, medals and certificates were in this case, as in the many previous contests, provided by the *Woman's Home Companion.*

Up to this time, the table of physical measurement standards with which the children at ages under five years were compared was based upon too few numbers to warrant its use for anything more than approximate averages. This first table, also, was based upon average measurements of both sexes combined, and the difficulties of the scorers were further increased by reason of the fact that the average measurements were published only for three-month intervals for ages under one year—6 months, 9 months, and 12 months—and for four-month intervals at ages one year and upward—16 months, 20 months, 24 months, 28 months, etc.

As a result of the first Better Babies Contest held in Newark, N. J., I proposed that the table of physical standards be thoroughly revised, that it be based upon larger numbers, that males and females be considered separately, and that the average measurements be published for single months of age. These improvements were recommended as theoretically desirable even before this contest was held, and the statistics of the 542 children, ages 6 to 36 months, entered in that contest, proved that only with the aid of such a table could the physical proportions of any given child be rated fairly.

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* In a later, revised score card the ratings are grouped as follows: Test I. Mental and Developmental, maximum total points 200; Test II. Measurements, maximum total points, 100; Test III. Physical Examination—maximum total, 500 points; Test IV. Oral and Dental Examination, 115 points; Test V. Eye, Ear, Nose and Throat, 85 points.

The Better Babies Bureau, of the *Woman's Home Companion*, invited me to compile such a table, and this was done in 1914, from measurements furnished by that Bureau and derived from Better Babies Contests which had been held in 23 different States during the years 1913 and 1914, including altogether 3,448 sets of measurements, of which 1,843 were of males and 1,605, of females. This first table was limited to ages 6 to 42 months, both inclusive, and as the statistics were compiled by single months the numbers for any given age were comparatively small. In spite of this fact, however, the averages gave exceptionally smooth results.

During the year 1914 a new development of the central purpose of Better Babies Contests was fostered by the Council on Public Health and Instruction, of the American Medical Association, but under the title of "Baby Health Conferences." At these conferences score cards similar to those used at the Better Babies Contests are filled out, including physical measurements. The physical measurements at both contests and conferences are made in a uniform manner and in accordance with instructions which go with the score cards. During the year 1915 these score cards of the American Medical Association were forwarded to me and the data were compiled and added to those already available through the courtesy of the *Woman's Home Companion*. In the early part of 1916 I found that the aggregate number of sets of measurements available exceeded 10,000, and this was thought to be a sufficiently large number to give satisfactory results for the purpose of compiling a revised standard anthropometric table for children of ages 6 to 48 months, both inclusive. This table, a copy of which is presented herewith, is to be published by the Committee on Public Health Education among Women, of the American Medical Association, and used in connection with the Better Babies Conferences held under the auspices of this Committee throughout the United States. This table, and the preliminary one of 1914, are thought to be the first for this country constructed in just this way—that is, from healthy children, all measured according to uniform rules and, in the main, by physicians, nurses, or other specially instructed persons. These tables differ somewhat from those referred to by pediatrists, such as Dr. Emmet L. Holt in his book entitled "Diseases of Infancy and Childhood." Dr. Holt's statistics for the first year of life are based upon observations made upon 100 healthy nursing infants at the Nursery and Child's Hospital, New York City. These children—50 males and 50 females—were weighed daily during the period of observation, and the purpose was to ascertain the normal rate of growth, which was found to be steady and fairly consistent from the third day. There were, of course, individual variations, but the average measurements—weight, height, etc.—increased gradually and consistently from the third day to the end of the first year of life.

Dr. Holt states that, "comparatively few observations have been published upon the weight during the second to the fifth years of life." He had, however, about 372 personal observations, from which he concludes that the gain in weight is about 6 lbs. during the second year, 4½ lbs. during the third year, and 4 lbs. during the fifth year. His observations were also to the effect that throughout this period the gain in weight of girls was at about the same ratio as that of boys, but that the girls remained on the average nearly one pound lighter.

In the accompanying table it is interesting to note that during the second year of life the average increase in weight for males was 5¼ lbs., and for females, 5⅝ lbs. The increase in height during the second year of life was, for males, 4⅜ inches, and for females, 4½ inches. The accompanying table also shows that the average weight of boys at the age of six months is 1¼ lbs. more than the average weight of girls at the same age. The average height of boys at the age of six months is 26½ inches, as compared with an average height for girls at the same age of 25⅞ inches. In other words, boys at the age of six months, according to this table, are ⅝ of an inch taller on an aver-

AVERAGE PHYSICAL MEASUREMENTS. (a)
MALES.

Age,		Weight,		Circumference of			Diameter of Chest.		Length of	
Months.	No.	Pounds.	Height.	Head.	Chest.	Abdomen.	Lateral.	Ant.-Post.	Arm.	Leg.
6	259	18	26½	17⅜	17⅜	17⅛	5⅜	4⅝	10¼	11⅜
7	256	19⅛	27¼	17⅝	17⅝	17⅜	5⅜	4⅝	10⅝	11¾
8	232	19¾	27⅝	18	17⅞	17¾	5½	4¾	10⅞	11⅞
9	211	20⅜	28⅛	18	17⅞	17¾	5½	4¾	11	12¼
10	209	20⅞	28½	18¼	18¼	17¾	5⅝	4¾	11¼	12½
11	193	21⅜	29	18⅜	18⅜	17¾	5¾	4¾	11½	12⅝
12	284	21⅞	29⅜	18⅝	18½	17⅞	5¾	4⅞	11⅝	13
13	264	22⅞	29⅞	18¾	18⅝	18⅛	5¾	4⅞	11⅞	13⅛
14	212	23	30¼	18¾	18⅝	18⅛	5⅞	4⅞	12	13⅜
15	215	23⅝	30¾	18¾	18¾	18¼	6	4⅞	12¼	13⅝
16	186	24⅛	31⅛	18⅞	18⅞	18⅜	6	4⅞	12¼	13⅞
17	159	24½	31⅜	18⅞	18⅞	18⅜	6	4⅞	12⅝	14
18	181	24⅝	31¾	19⅛	19⅛	18½	6	4⅞	12⅝	14¼
19	156	25½	32¼	19⅛	19⅛	18½	6⅛	5	12⅞	14⅜
20	170	25¾	32⅝	19⅛	19¼	18½	6¼	5	13⅛	14¾
21	159	25¾	32⅞	19¼	19¼	18⅝	6¼	5	13⅛	14⅞
22	160	26⅞	33¼	19⅜	19⅝	18⅞	6¼	5	13⅜	15
23	184	27	33⅝	19⅜	19⅝	18⅞	6¼	5	13⅜	15⅛
24	201	27⅛	33¾	19⅜	19⅝	19	6¼	5⅛	13½	15⅜
25	150	27⅞	34	19½	19¾	19¼	6¼	5⅛	13¾	15⅝
26	147	28¼	34⅛	19½	19⅞	19¼	6¼	5⅛	13⅞	15⅝
27	126	29	34¾	19⅝	20	19¼	6⅜	5⅛	14⅛	15⅞
28	121	29⅛	35⅛	19⅝	20	19⅜	6½	5⅛	14⅛	16⅛
29	94	29¼	35⅜	19⅝	20	19⅜	6½	5⅛	14¼	16⅛
30	153	29½	35⅜	19⅝	20⅛	19½	6½	5⅛	14⅜	16⅜
31	113	30½	35½	19¾	20⅜	19½	6½	5⅛	14½	16½
32	110	30⅝	36	19¾	20⅜	19½	6½	5⅛	14⅝	16⅝
33	102	30⅝	36⅛	19⅞	20⅜	19⅝	6½	5⅛	14⅝	16¾
34	113	31⅛	36½	19⅞	20⅜	19¾	6½	5⅛	14⅞	17⅛
35	116	31⅞	36¾	19⅞	20½	19⅞	6½	5⅛	15⅛	17¼
36	76	32¼	37⅛	19⅞	20⅝	19⅞	6½	5⅛	15⅛	17½
37	25	32¼	37⅜	19⅞	20¾	20	6½	5⅛	15⅛	17½
38	37	32⅜	37½	19⅞	20¾	20	6⅝	5⅛	15⅜	17⅝
39	36	33⅛	37⅞	20	20¾	20	6⅝	5⅛	15⅝	17⅞
40	24	33½	38½	20	20¾	20¼	6⅝	5⅛	15⅝	18¼
41	21	33⅝	38⅝	20	20¾	20¼	6⅝	5⅛	15⅝	18¼
42	27	33¾	38⅝	20	20⅞	20¼	6⅝	5⅛	15⅝	18¼
43	17	33¾	38¾	20	20⅞	20¼	6⅝	5⅛	15⅝	18⅜
44	19	34¼	38⅞	20	21	20¼	6¾	5⅛	15⅞	18½
45	27	34½	39	20	21	20⅜	6¾	5⅛	15⅞	18⅝
46	17	34¾	39	20	21	20⅜	6¾	5⅛	16	18⅝
47	21	35¾	39¼	20⅛	21	20½	6¾	5¼	16	18⅞
48	19	35⅞	39½	20⅛	21⅛	20⅝	6¾	5⅜	16	18¾

Total number of males measured, 5,602.

(a) All measurements are in inches except weight.

AVERAGE PHYSICAL MEASUREMENTS. (a)
FEMALES.

Age, Months.	No.	Weight, Pounds.	Height.	Circumference of Head.	Circumference of Chest.	Circumference of Abdomen.	Diameter of Chest. Lateral.	Diameter of Chest. Ant.-Post.	Length of Arm.	Length of Leg.
6	176	16¾	25⅞	16⅞	16⅞	16¾	5¼	4½	9⅞	11⅛
7	188	17⅜	26½	17⅛	17⅛	17	5¼	4½	10⅛	11⅜
8	186	18¼	27	17⅜	17⅜	17¼	5⅜	4⅝	10⅜	11¾
9	183	19⅛	27⅝	17⅝	17⅝	17⅜	5⅜	4⅝	10¾	12
10	175	19½	27⅞	17⅞	17¾	17⅜	5⅜	4⅝	10¾	12⅛
11	165	20⅛	28⅜	17⅞	17⅞	17⅝	5½	4⅝	11⅛	12⅜
12	228	20¾	28⅞	18⅛	18	17⅝	5⅝	4⅝	11¼	12¾
13	208	21	29⅜	18⅛	18⅛	17¾	5⅝	4⅝	11½	13
14	208	21⅝	29½	18⅜	18⅜	18	5¾	4¾	11⅝	13⅛
15	197	21⅞	30⅛	18⅜	18⅜	18	5¾	4¾	11⅞	13⅜
16	176	22⅝	30½	18⅜	18½	18	5⅞	4⅞	12	13⅝
17	143	22⅞	30¾	18⅜	18½	18	5⅞	4⅞	12⅛	13⅞
18	178	23⅜	31⅛	18½	18⅝	18⅜	6	4⅞	12¼	14
19	132	23¾	31½	18⅝	18¾	18⅜	6	4⅞	12¾	14¼
20	131	24⅛	32	18⅝	18⅞	18½	6	4⅞	12⅝	14½
21	142	24¾	32¼	18⅝	19	18½	6⅛	4⅞	12⅞	14¾
22	125	25¼	32⅝	18⅞	19⅛	18⅝	6⅛	4⅞	13	14⅞
23	134	25⅝	32⅞	19	19¼	18⅞	6⅛	4⅞	13¼	15
24	160	26⅜	33⅜	19	19⅜	19	6¼	4⅞	13⅜	15⅜
25	126	26⅞	33¾	19	19½	19	6¼	4⅞	13⅝	15⅝
26	131	27¼	33⅞	19⅛	19½	19⅛	6¼	5	13⅝	15½
27	136	27¼	33⅞	19⅛	19½	19⅛	6¼	5	13⅝	15¾
28	95	27¾	34⅝	19⅛	19½	19⅛	6¼	5	14	16
29	95	27¾	34¾	19⅛	19½	19¼	6¼	5	14	16¼
30	132	28¼	34⅞	19¼	19¾	19¼	6¼	5	14	16¼
31	109	28¾	35⅛	19¼	19¾	19¼	6¼	5	14⅛	16⅝
32	116	29	35⅜	19¼	19⅞	19⅜	6⅜	5	14¼	16⅝
33	97	29⅛	35⅝	19¼	19⅞	19½	6⅜	5	14¼	16⅝
34	91	30⅛	36½	19⅜	20	19⅝	6⅜	5	14½	16⅞
35	84	30¼	36½	19⅜	20	19⅝	6⅜	5	14⅝	16⅞
36	90	30½	36¾	19⅜	20	19¾	6⅜	5	14⅝	17⅛
37	28	30¾	36¾	19½	20	19¾	6⅜	5	14⅞	17⅛
38	31	31	37	19½	20⅛	19¾	6⅜	5	14⅞	17¼
39	37	31⅝	37¼	19⅝	20⅛	19¾	6⅜	5⅛	15	17½
40	26	32	37½	19⅝	20⅛	20	6⅜	5⅛	15¼	17¾
41	16	32¼	37¾	19⅝	20¼	20	6⅜	5⅛	15⅜	18
42	42	32½	38	19⅝	20¼	20	6⅜	5⅛	15⅜	18⅛
43	12	32¾	38¼	19⅝	20¼	20	6⅜	5⅛	15⅜	18¼
44	22	33	38½	19⅝	20⅜	20	6⅜	5⅛	15½	18⅜
45	18	33¼	38½	19⅝	20⅜	20	6⅜	5⅛	15½	18⅜
46	9	33½	38¾	19¾	20⅜	20⅛	6½	5¼	15⅝	18½
47	12	33½	38⅞	19¾	20⅜	20⅛	6½	5¼	15⅝	18½
48	31	33¾	39	19¾	20⅜	20⅛	6½	5¼	15¾	18⅝

Total number of females measured, 4,821.
(a) All measurements are in inches except weight.

age than girls. It is interesting also to note the relative changes in the circumferences of the chest and abdomen. The circumference of the abdomen in very young children generally exceeds the circumference of the chest, and this is frequently true at ages four to six months, but with increasing age up to nine months there is only a slight difference in the measurements. This is true of both sexes. From the age one year upward the excess of circumference of the chest over the circumference of the abdomen is greater for boys than for girls. For illustration, at age 24 months the average chest circumference of boys is 19⅝ inches, and the average abdomen circumference of boys is 19 inches. For girls of the same age, the chest circumference is 19⅜ inches, and the abdomen circumference is 19 inches.

The head circumference of boys was found to average approximately ½ inch more than the head circumference of girls, and this difference is persistent throughout the period of life covered by the table.

From this table the average rate of growth can be determined with approximate accuracy for any duration within the limits of the table, and the comparative rate of growth of different parts of the body is likewise ascertainable for both sexes. The great majority of the children whose measurements are included in this table were of American-born parents; the children, however, were of different stocks, including German, Irish, Swedish, some Italian, and some of various other races. It would be desirable to have similar tables for the different racial elements, and perhaps even for different sections of the country. There is some evidence that the average measurements, even of these young children, would be found to differ, in the South, for instance, as compared with the North and West, entirely aside from the probable racial differences. It would seem, however, that this table, being based upon measurements of normal healthy children in various sections of the country, should serve as a fair guide for many practical purposes without any additional refinements.

FREDERICK S. CRUM.

A PLAN FOR GATHERING STATISTICAL DATA AS A BY-PRODUCT OF ADMINISTRATIVE WORK.

We, in this country, have for a number of years been familiar with the using for scientific purposes of records kept for administrative purposes. Thus the records kept by charity organization societies, chiefly in order to increase the efficiency of their work with individual families, have been extensively used as data for the scientific study of the causes of poverty and dependency.* In some cases also items or questions, which were not necessary for administrative purposes, have been added to the record forms with the purpose in view of using the data as a basis for scientific studies of cause and effect. In such cases the supplementary data recorded for scientific uses are a sort of by-product, turned out in the regular course of administrative record keeping.

This plan of gathering data as a by-product to regular administrative work has not been so extensively used in field investigations. In at least one instance, however, effective use has been made of it—by Dr. John Robertson, Medical Officer of Health for Birmingham, England, in his study of the relation of the employment of mothers to infant mortality. The advantage of his method appears to be sufficiently great to warrant a brief description of it.

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* See for example Devine's "Misery and Its Causes," pp. 230 ff., and Conyngton's "How to Help," pp. 15-16, 342-3.